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Richards et al.

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(54) **VIBRATORY PEP THERAPY SYSTEM WITH MEDICATED AEROSOL NEBULIZER**

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This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

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(51) **Int. Cl.**

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A61M 16/08	(2006.01)
A61M 16/20	(2006.01)
A61M 11/06	(2006.01)
A61M 15/00	(2006.01)

(52) **U.S. Cl.**

CPC ***A61M 16/08*** (2013.01); ***A61M 15/0016*** (2014.02); ***A61M 16/0006*** (2014.02); ***A61M 16/208*** (2013.01); ***A61M 16/209*** (2014.02); *A61M 11/06* (2013.01); *A61M 15/0086* (2013.01); *A61M 16/0816* (2013.01); *Y10S 137/908* (2013.01)

(58) **Field of Classification Search**

CPC A61M 16/208; A61M 16/206; A61M 16/0006; A61M 16/0816; A61M 16/0833

USPC 128/204.18, 204.19, 205.24, 205.23; 482/13; 137/908; 600/538, 540

See application file for complete search history.

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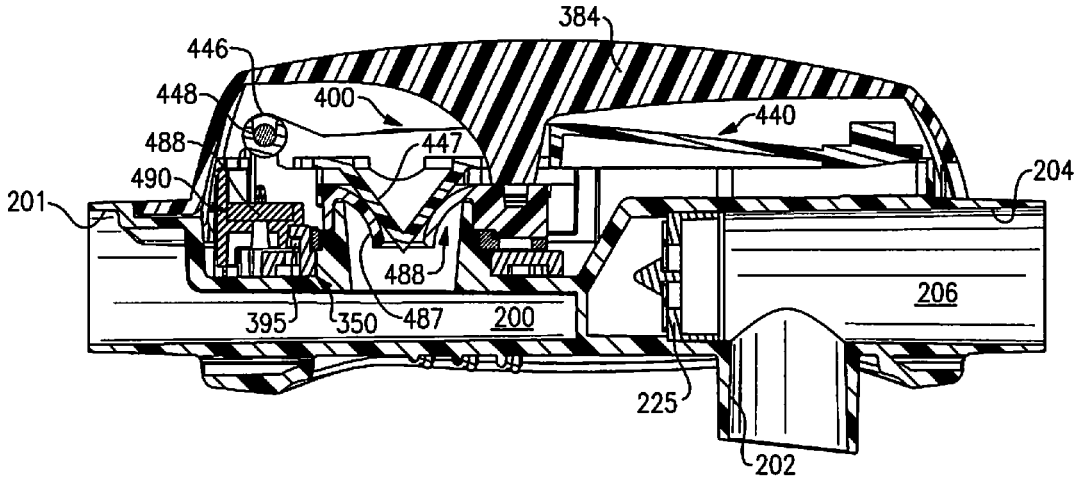
(57) **ABSTRACT**

A positive oscillatory expiratory air pressure respiratory therapy device which is adapted to receive a nebulizer for administering aerosolized medicant for selective administration during oscillatory positive expiratory pressure (PEP) therapy.

16 Claims, 7 Drawing Sheets



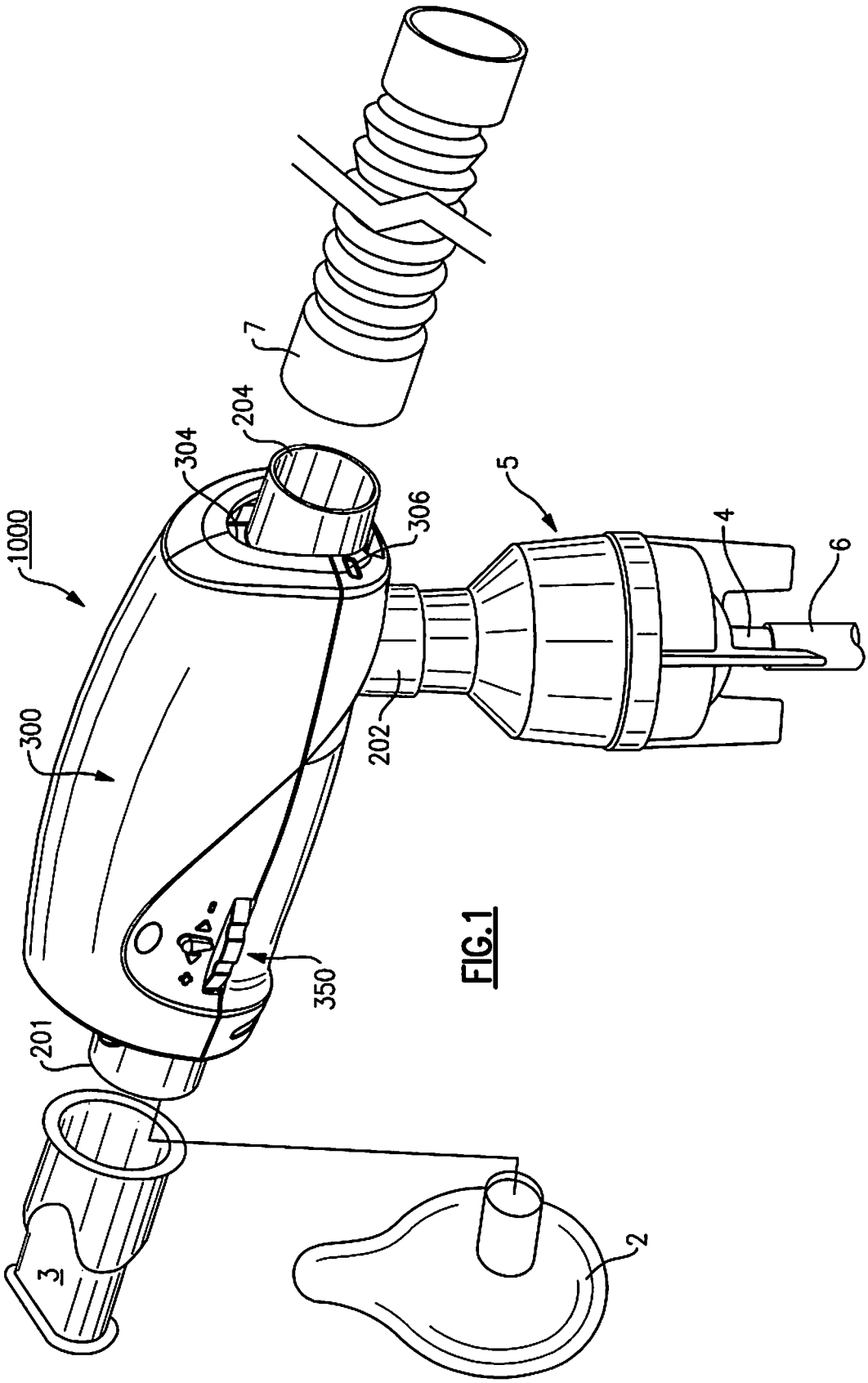


FIG.1

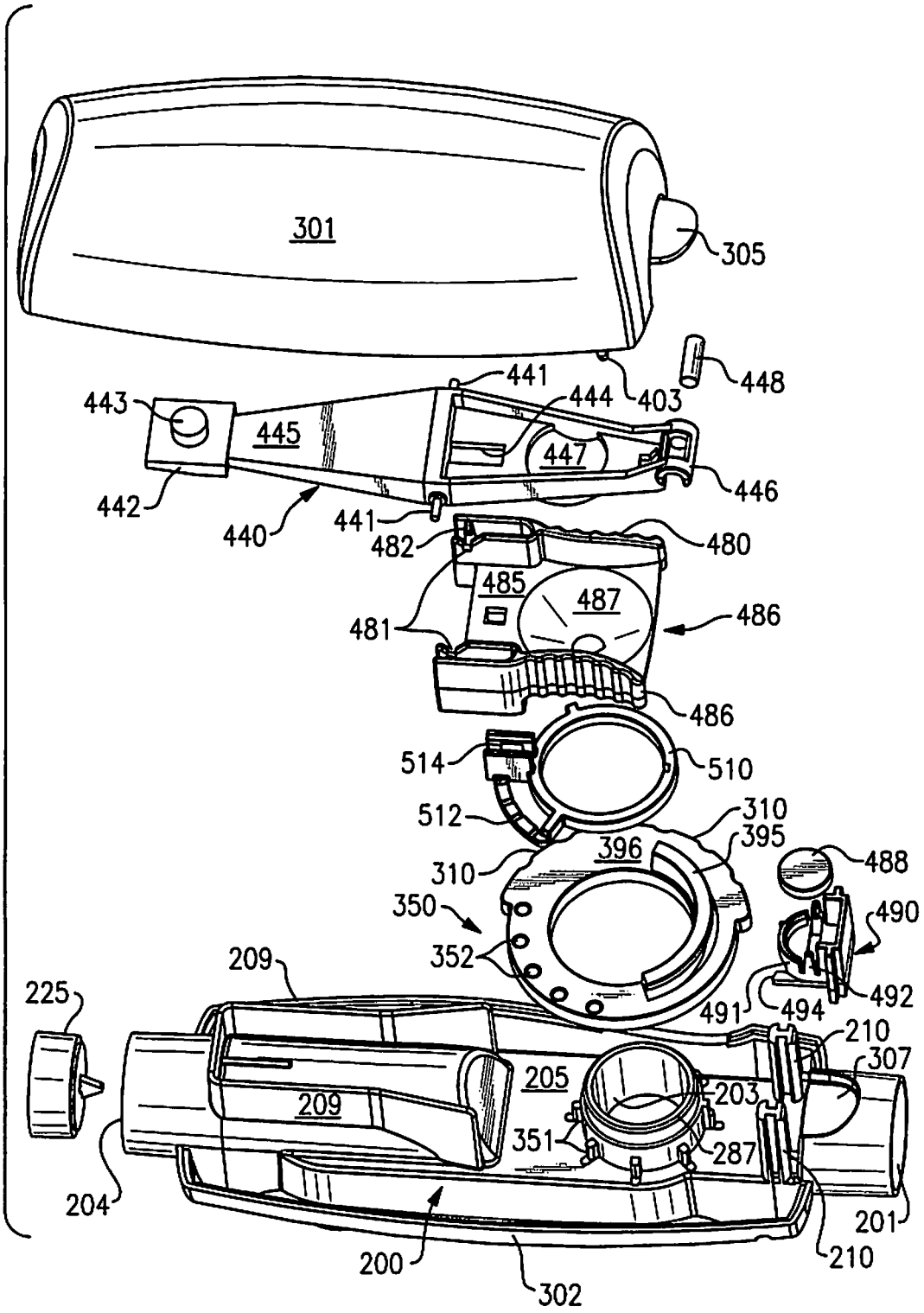

301
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FIG.2

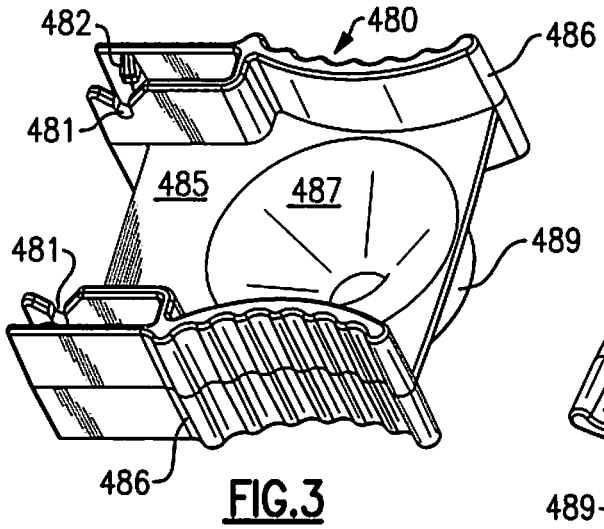


FIG.3

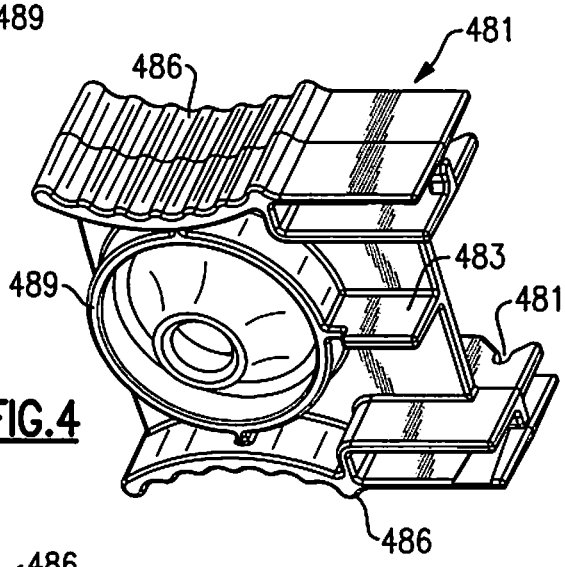


FIG.4

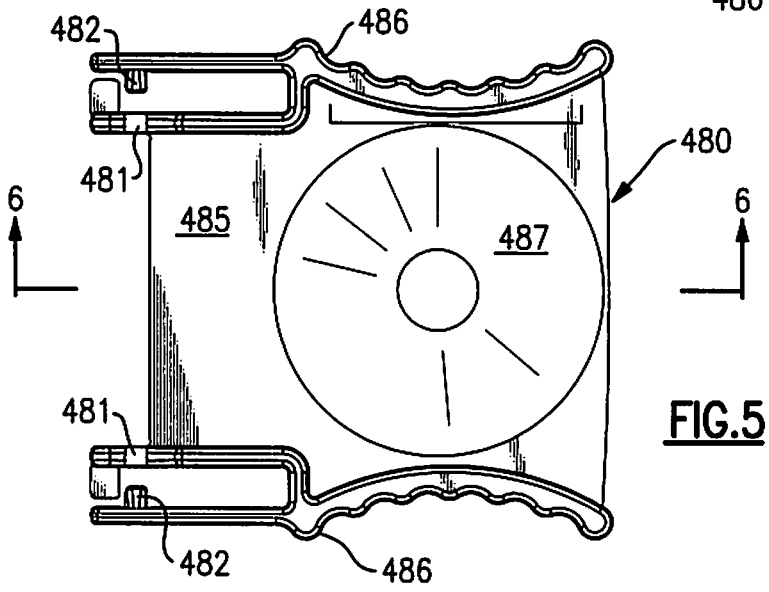


FIG.5

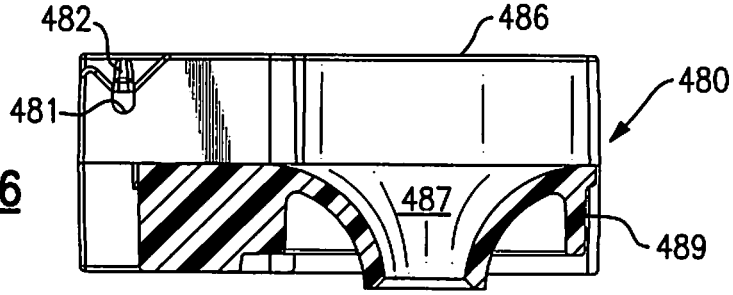
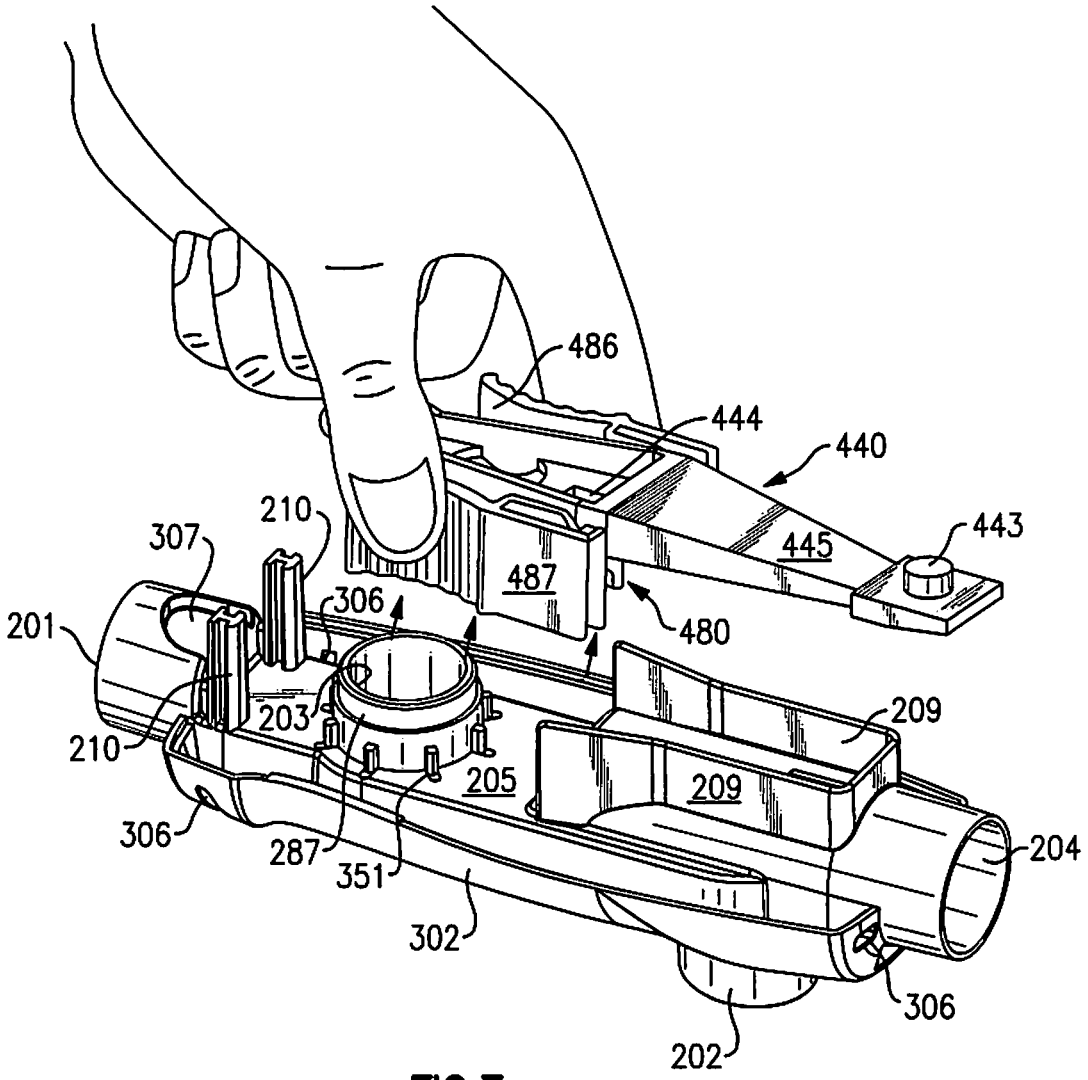


FIG.6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440
443
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307
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287
351
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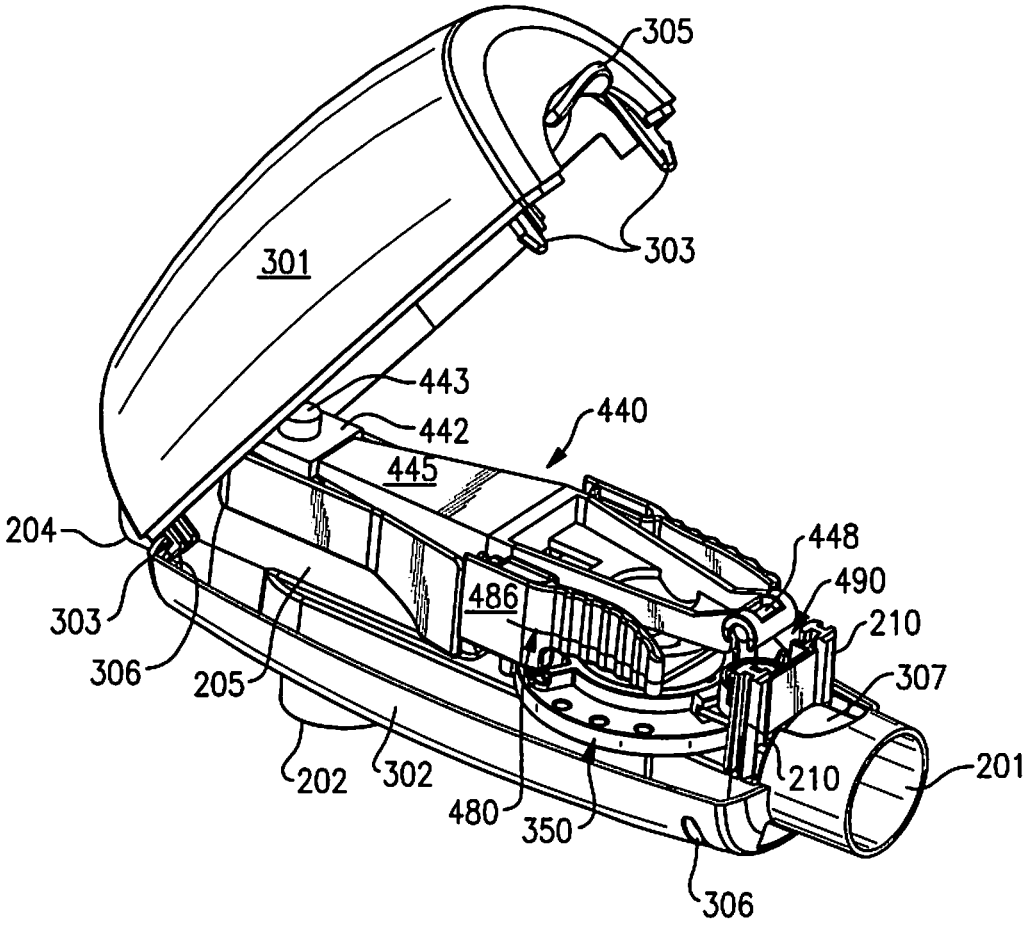
202

FIG.7


305
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303
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302
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201
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FIG.8

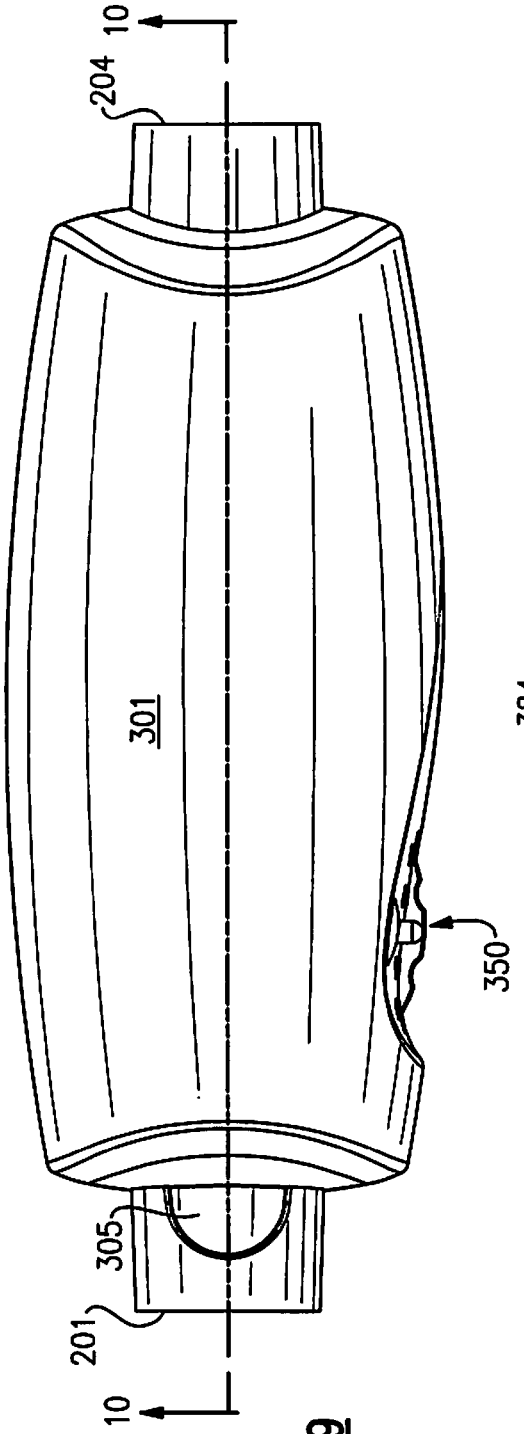
10
204
301
350
305
201
10

FIG.9

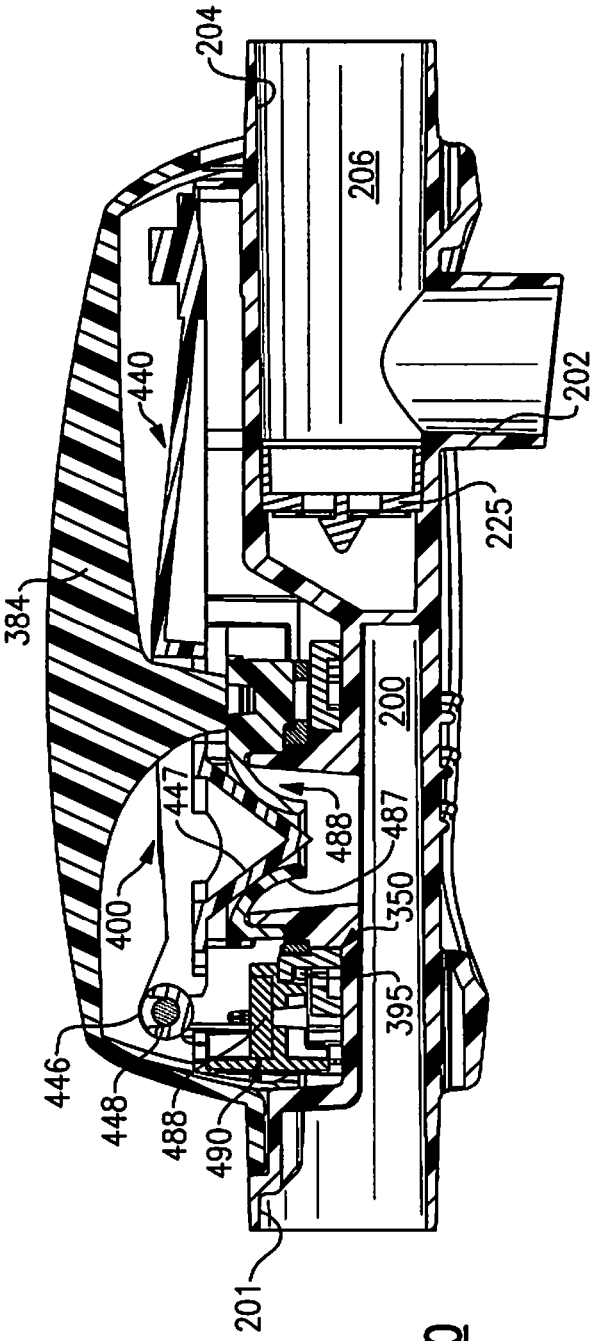
204
206
202
440
225
384
200
447
488
487
400
350
395
446
448
488
490
201

FIG.10

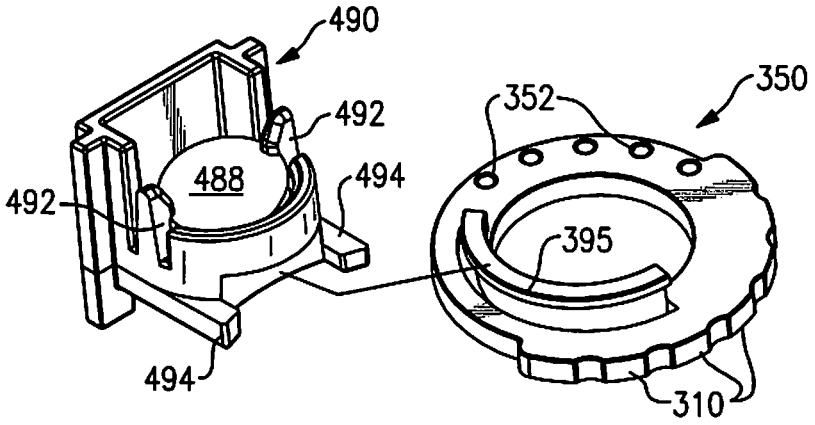

FIG.11

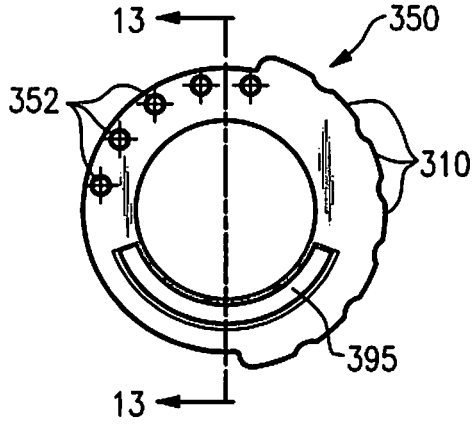

FIG.12

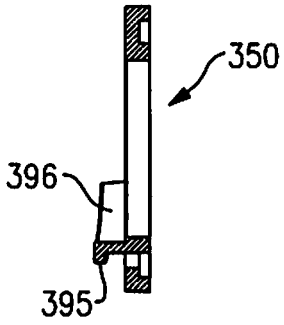

FIG.13

VIBRATORY PEP THERAPY SYSTEM WITH MEDICATED AEROSOL NEBULIZER

CROSS-REFERENCES TO RELATED APPLICATION

This application is a continuation of U.S. application Ser. No. 11/538,329 filed Oct. 3, 2006, now issued as U.S. Pat. No. 8,225,785.

FIELD

This invention relates to the field of respiratory therapy, and, more particularly, to a single patient use positive oscillatory expiratory pressure respiratory therapy device adapted for use with a medicated aerosol drug delivery system to administer positive expiratory pressure therapy (PEP).

BACKGROUND

Persons who suffer from mucus-producing respiratory conditions that result in large amounts of mucus being produced in the lungs often require assistance in the removal of these secretions. If these secretions are allowed to remain in the lungs, airway obstruction occurs resulting in poor oxygenation and possible pneumonia and/or death. One of the clinically recognized treatments for this condition is a technique known as positive expiratory pressure therapy or PEP. With PEP therapy, a patient exhales against a resistance to generate expiratory pressure at a substantially constant rate of flow. Prescribed expiratory pressures are generally in the range of 10-20 cm of H_2O, although other pressure ranges and pressures can be used, with a preferred flow rate of between 10-25 liters per minute.

In the use of PEP therapy, a patient breaths through an orifice restrictor to generate a positive pressure in the lungs during exhalation, with the pressure falling to zero at the end of the exhalation. By selection of the proper-sized orifice, a given pressure is determined for the exhalation flow rate generated by an individual patient. This extended, substantially constant, flow of elevated-pressure exhalation has been shown to be effective for moving secretions trapped in the lungs to the larger airways where the secretions can then be removed through coughing. It has also been found that in the treatment of patients having chronic obstructive pulmonary disease (COPD), chronic bronchitis, cystic fibrosis, atelectasis, or other conditions producing retained secretions, treatment with PEP therapy is improved by combining positive expiratory pressure therapy with airway oscillation and intermittent air-flow acceleration. To this end hand-held, single patient multi-use, positive expiratory pressure respiratory therapy devices have been developed such as those of U.S. Pat. No. 6,581,598, "POSITIVE EXPIRATORY PRESSURE DEVICE", and U.S. Pat. No. 7,059,324, "POSITIVE EXPIRATORY PRESSURE DEVICE".

The devices of the referenced patents have accomplished their desired objectives, and, accordingly, it has become desirable to incorporate such PEP and COPD therapies with a medicated aerosol drug delivery system.

SUMMARY

The present invention is directed to overcoming one or more of the problems or disadvantages associated with the relevant technology. As will be more readily understood and fully appreciated from the following detailed description of a preferred embodiment, the present invention is embodied in a positive oscillatory expiratory air pressure respiratory therapy device which includes a medicated aerosol nebulizer for the selective administration of medicated oscillatory PEP therapy.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages of the invention, together with additional features contributing thereto and advantages accruing therefrom, will be apparent by reference to the following detailed description of a preferred embodiment of the invention which is shown in conjunction with the accompanying drawings, which are not to scale so as to more clearly show the details, wherein like reference numbers indicate corresponding parts and like elements throughout the several views, wherein:

FIG. **1** is a perspective view of an embodiment of the invention in a suitable environment;

FIG. **2** is an exploded perspective view of the embodiment illustrated in FIG. **1** with portions removed to better illustrate the internal structure thereof;

FIGS. **3**, **4**, **5** and **6** are, respectively, an upper and lower perspective view, top elevation and sectional view of a platform portion of the embodiment illustrated in FIG. **1** to better illustrate a portion of the structure forming a non-linear discharge orifice;

FIG. **7** is a perspective view of rocker and platform portions of the embodiment illustrated in FIG. **1** with parts removed as these portions are installed onto a lower portion of the device housing for producing an oscillatory positive expiratory air pressure;

FIG. **8** is a perspective view of an assembled oscillatory positive expiratory pressure device with the upper portion of the device open to better illustrate a portion of the structure for adjusting the magnitude and frequency of the oscillatory positive expiratory air pressure and the ease in which the device may be disassembled and assembled for cleaning;

FIG. **9** is a top elevation view of the assembled oscillatory positive expiratory pressure producing device;

FIG. **10** is a sectional view of the oscillatory positive expiratory pressure device as illustrated in FIG. **9** taken along lines **10-10** to better illustrate the internal structure for creating the oscillatory positive expiratory air pressure and to control the oscillatory frequency and pressure, and the manner in which the magnitude and frequency of the oscillations can be varied;

FIG. **11** is a perspective view of an adjustable dial portion of the oscillatory positive expiratory pressure device to better illustrate the manner in which a magnetic coupling and magnet holder are positionable relative to the rocker portion illustrated in FIG. **2** to set the magnitude and frequency of the oscillations;

FIG. **12** is a planar view of the adjustment dial illustrated in FIG. **11** to better illustrate the structure and function thereof; and

FIG. **13** is a sectional view of the adjustment dial taken along lines **13-13**.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, there is illustrated in FIGS. **1** and **2** an oscillatory positive expiratory pressure (PEP) respiratory therapy device **1000** for applying oscillatory positive expiratory air pressure therapy to a patient to which medicated aerosolized drugs are administered by means of a small volume nebulizer **5**.

The oscillatory PEP device **1000** is coupled in fluid communication to the nebulizer **5** which functions to supply aerosolized medicine and/or humidified gas to the patient and may be used by the patient with a standard 22 mm removable mouthpiece **3** or a 22 mm standard mask **2**. Oxygen and/or other gases to be supplied to the patient, as determined by a clinician, are coupled to the nebulizer **5** through a tubing **6** connected at one end to a suitable fitting **4** on the base of the nebulizer **5**, and at another end to the desired gas source (not shown). If desired, as determined by the clinician, medication can be added to the nebulizer **5** for administration to the patient. The nebulizer **5** is coupled to the oscillatory PEP device **1000** through a nebulizer input port **202** on the underside of the PEP device **1000** so that the desired gases and medicine are supplied to the patient, preferably at a rate between about 5 to about 7 liters per minute.

The patient inhales deeply through a patient coupling port **201** to which, for convenience of illustration, the removable mouth piece **3** is connected to enable the patient to inhale at a rate and to an extent as determined by the clinician. Inspiratory air enters the PEP device **1000** through an inspiratory air port **204**. If desired, reservoir tubing **7** may be attached to the inlet port **204**. A one-way valve **225** is positioned in the inlet air chamber **206** of the PEP device downstream of the inspiratory air port **204** and the nebulizer input port **202** so that inspiratory air may freely enter the device through the valve **225**, but expiratory air from the patient is blocked from being expelled through the inspiratory air port **204** or back into the nebulizer **5**.

Expiratory air is passed from the patient through the mouthpiece **3** and out through the patient coupling port **201** into the oscillatory PEP device **1000**. The expiratory air passes through the patient coupling port **201** into and through an air-flow tube **200** to an expiratory-air-driven oscillatory rocker assembly **400** contained within a two part housing **300**. The expiratory-air-driven oscillatory rocker assembly **400** creates an oscillatory positive expiratory air pressure (PEP) which is applied to the patient during exhalation. The expiratory-air-driven oscillatory rocker assembly **400** comprises two portions, a rocker portion **440** and a rocker support or platform portion **480** which act together in creating the oscillatory PEP therapy. It is preferable that the patient maintain exhalation for about 3 to about 4 seconds.

To control the magnitude and frequency of the oscillatory pressure applied to the patient, a rotatable frequency control dial **350** is carried in a horizontal position about a discharge opening **203** of the air-flow tube **200**, the conduit which receives the expiratory air from a patient which is passed through the patient coupling port **201**. The air-flow tube **200** is carried by a lower housing portion **302**, and supports the expiratory-air-driven oscillatory rocker assembly **400**. By operation of the adjustable frequency control dial **350**, the relative positioning between the oscillatory PEP inducing portions of the oscillatory rocker assembly **400**, the rocker portion **440** and the rocker support portion **480**, are adjusted to control or set the magnitude and frequency of the oscillatory expiratory air pressure.

The expiratory-air-driven oscillatory rocker portion **440** is best illustrated in the exploded view of FIG. **2** and FIGS. **7**, **8** and **10**. The rocker support portion **480**, which functions in cooperation with the rocker portion **440** to produce an oscillatory expiratory air flow and pressure, is also illustrated in the exploded view of FIG. **2**, and in more detail in FIGS. **7**, **8** and **10**. The expiratory-air-driven oscillatory rocker portion **440** and the rocker support portion **480**, when assembled together, form the rocker assembly **400**.

The rocker assembly **400** is supported on the air-flow tube **200** which has at one end the inspiratory air port **204** through which inspiratory air is received by the patient by means of the one-way valve **225**, and at another end a discharge opening **203** through which expiratory air from the patient is passed to the rocker assembly **400** to produce the oscillatory expiratory air flow and pressure. The air-flow tube discharge opening **203** is formed on a top flat planar surface portion **205** of the air-flow tube **200** and the expiratory air passed there through is applied to the oscillatory rocker assembly **400** for creating the oscillatory PEP therapy for the patient. After the expiratory air has been applied to the oscillatory rocker assembly **400** to create the desired oscillatory waveform, the air thereafter exits from the device **1000** through an exit opening **304** formed by a spacing between the upper and lower portions **301** and **302**, respectively, of the housing **300** at an end opposite to the patient coupling port **201**.

As best illustrated in FIGS. **2**, **7**, **8** and **10**, the rocker portion **440** is balanced for pivotal movement about pivot pins **441** on spaced pivot supports **481** formed on a platform **485** of the rocker support portion **480**. The pivot pins **441** form a pivot axis transverse to the plane of motion of the rocker portion **440** and lie in a plane above and extending transverse to the longitudinal axis of the platform **485** upon which the rocker portion **440** is supported. The pivot pins **441** engage a pair of locking guides **482** carried by the platform **485**, one of which is positioned adjacent each of the pivot supports **481** to maintain the pivot pins **441** in their proper position on the pivot supports **481** as illustrated. In this manner the rocker portion **440** is pivotal relative to the rocker support portion **481** regardless of the orientation of the device **1000**, allowing the device **1000** to function regardless of its orientation in use.

A balance pad **442** and balancing cylinder **443** are formed at one end of the rocker arm **445** to counterbalance the weight of a cone-shaped air-flow closure member **447** and a pin **448** formed of a magnetically attractable material, such as stainless steel, both of which are carried at the opposite end of the rocker arm **445**. Pin **448** is carried at one distal end of the rocker arm **445** between a plurality of gripping fingers **446** which encircle the pin **448** to hold the pin **448** in a position to be exposed to a magnetic field of a disc-shaped magnet **488** carried on the adjacent end of the air-flow tube **200** in a magnet holder **490**. The disc-shaped magnet **488** and the pin **448** function to control or set the frequency of the PEP therapy oscillations and the expiratory air pressure required from the patient for this respiratory therapy.

In operation the cone-shaped air-flow closure member or air-flow closure cone **447** is sized and positioned on the rocker arm **445** to be periodically inserted into a tapered bell-shaped or trumpet-shaped air-discharge outlet **487** formed in the platform **485** to create a non-linear expiratory air discharge opening or outlet to create the oscillatory PEP when expiratory air is discharged through the air-flow tube discharge opening **203**. As best illustrated in FIGS. **6** & **10**, the interior of the air-discharge outlet **487** has a non-linear taper or bell-shaped interior to form the non-linear air discharge outlet for creating the oscillatory PEP therapy in response to the pivotal movement of the air-flow closure cone **447** in to and out therefrom. In this manner the discharge outlet **487** is periodically closed and re-opened in response to the patients expiratory air discharge allowing the oscillatory PEP therapy treatment.

The oscillatory rocker assembly **400** is secured onto the air-flow tube **200** and positioned within the housing **300** by means of a cowling **489** which extends downwardly from beneath the platform **485** encircling the exterior of the air-discharge outlet **487** to encircle and engage onto the out-

wardly extending circular outer sidewalls **287** of the air-flow tube discharge opening **203** as best illustrated in FIGS. **4** and **7**. A pair of side walls **486** of the platform **485**, the bottoms of which rest on the planar surface **205** of the air-flow tube **200**, are formed with a ridged finger-engaging surface to facilitate the removal and repositioning of the rocker support portion **480** onto the air-flow tube **200** for cleaning the device **1000** as necessary. Sidewalls **486** extend vertically outward from the planar surface **205** of the air-flow tube **200** and are spaced apart a distance sufficient to receive the rocker arm **445** there between. In this manner the rocker arm **445** is protected between the sidewalls **486** when the upper and lower housing portions, **301** and **302**, respectively, are separated for cleaning. This positioning protects the rocker assembly **400** from being inadvertently improperly grasped by a user or clinician when disassembling the device **1000** for cleaning, as the user's attention is directed to the ribbed or ridged finger-engaging surface of the side walls **486** which are intended to be grasped when the rocker assembly **400** is to be removed. A tang **384** extends downwardly from the interior of the upper housing portion **301**, passing through an opening **444** formed in the rocker arm **445**, to engage the upper surface **205** of the platform **485** to retain these components in the proper position regardless of the orientation of the device **1000** when in use.

The upper and lower housing portions, **301** and **302**, respectively, are formed as two separable portions to facilitate access into the interior of the device for cleaning. To this end, the upper housing portion **301** is formed with a pair of tabs **303** at each end designed to engage complementary recesses **306** formed in the lower housing portion **302** to maintain the two portions of the housing **300** engaged unless it is desired to open the housing **300** for access to the interior thereof. When it is desired to open the housing **300**, the sides of the upper housing **301** are compressed towards each other to facilitate release of the tabs **303** from the engaging recesses **306**. A securing tab **305** extends outwardly from one end of the upper housing portion **301** in a position to engage a complementary recess **307** formed in the upper housing portion **301** adjacent to the patient coupling port **201** to facilitate securing the two housing portions together. The joinder of the securing tab **305** into the complementary recess **307** creates an outer diameter of a size for receiving the distal end of a standard mouthpiece **3** or mask **2** to prevent the inadvertent separation of the housing portions **301** and **302** when such components have been installed on the device **1000** when in use.

To control or set the desired frequency and/or expiratory pressure for the administration of the oscillatory PEP therapy, the magnetically attractable pin **441** is positioned on the rocker arm **445** within the magnetic field of the disc magnet **488**. The disc magnet **488** is carried in a holder **490** which is slidably positionable in a vertical direction along a pair of vertically extending guides **210** which extend upwardly from the planar surface **205** of the air-flow tube **200** adjacent to the patient coupling port **201** in accordance with the rotational position of the frequency control dial **350**. In this manner the desired frequency and/or expiratory pressure can be readily set or controlled by the user in accordance with the clinician's instructions.

The disc magnet **488** is carried in the holder **490** in a receiver pocket **491**, and has a plurality of gripping or centering fingers **492** for retaining the magnet **488** in the circular-shaped receiver pocket **491**. The receiver pocket **491** is formed at one end of the holder **490** and is movable in a vertical direction along the guides **210**. The bottom of the holder is formed with a plurality of stops or feet **494** spaced from the bottom of the receiver pocket **491** for engaging therebetween a lip portion **395** of a cam **396** formed on the rotatable frequency control dial **350** carried in a horizontal position about the discharge opening **203** of the air-flow tube **200**. In this manner the disc magnet **488** can be selectively positioned by the device user in operative proximity to the steel pin **448** to control or set the oscillatory frequency and/or expiratory air pressure desired for administering the oscillatory PEP therapy in accordance with the instructions of the clinician.

Referring to FIGS. **2**, **8** and **10-13**, the rotatable frequency control dial **350** and the cam **396** formed thereon are positioned concentrically about the sidewalls **287** of the air-flow tube discharge opening **203** by a plurality of guides **351**. The inner diameter of the rotatable frequency control dial **350** is sized such that the dial **350** is freely rotatable while the guides **351** maintain the dial concentric with the sidewalls **287**. The cam **396** is positioned such that the lip portion **395** thereof engages the magnet holder **490** between the bottom of the disc magnet receiver **491** and the stops or feet **494** so that the holder **490** is raised or lowered in accordance with the rotational position of the frequency control dial **350**. In this manner the intensity of the magnetic field of the disc magnet **488** relative to the steel pin **448** carried by the rocker arm **445** will be varied there between as determined by the spacing between these components to provide an adjustable range of expiratory air pressure to be set for the creation of the oscillatory expiratory air pressure pulses.

To assist a user or the health care provider in using the device **1000**, once the proper magnetic field strength has been established, a plurality of indicia **310** spaced along the frequency control dial **350** can be used to readily relocate the proper positioning. In addition, to maintain the proper positioning once the position has been determined, a series of defeats **352** are utilized to prevent the inadvertent rotation of the dial **350**. To this end a collar **510** supported from beneath the platform **485** encircles the upper portion of the sidewalls **287** of the air-flow tube discharge opening **203** and includes a projection **512** which sequentially engages the detents **352** to prevent inadvertent rotation of the frequency control dial **350**. A recess **514** is engaged by a tab **414** extending downwardly from the bottom of platform **485** to hold collar **510** in the desired position.

In use, a patient discharges expiratory air through the patient coupling port **201** of the air-flow tube **200** which passes through the air-flow tube discharge opening **203** to the oscillatory rocker assembly **400** and then out of the device **1000** through the exit space **304** between the two housing portions **301** and **302**. Accordingly, the expiratory air pressure is applied against the cone-shaped closure **447** of the rocker **445** which forms a closure of the non-linear discharge opening or orifice **487**. The pressure of the patient's expiratory air will raise the cone-shaped closure **447**, causing the rocker portion **440** to pivot about the pivot pins **441** against the force of the magnetic field between the disc magnet **488** carried on the pivotal rocker support portion **480** and the steel pin **448** carried on the rocker assembly **400**. As the cone-shaped closure **447** moves upwardly in response to the increasing expiratory air pressure, the constant taper of the conical shape of the cone-shaped closure **447** in combination with the bell-shaped or trumpet-shaped non-linear taper discharge opening **487** forms a non-linear discharge orifice which increases in effective discharge area thereby decreasing the air pressure applied against the cone-shaped closure **447** and reducing the upward acceleration of the rocker arm **445**.

When the magnetic force and the air flow over the bell-shaped or non-linear tapered interior surface of the discharge outlet **487** overcome the expiratory air pressure applied to the

tapered cone-shaped closure **447**, the cone-shaped closure **447** will again begin to move downwardly and accelerate into the bell-shaped non-linear tapered discharge orifice **487**. As the cone descends into the air flow path through the discharge outlet or orifice **487**, the annular flow area diminishes reducing the airflow rate and increasing the air pressure. This continues until the downward momentum is overcome, and the cone **447** resumes its upward acceleration. Maximum pressure is obtained at this point, and another cycle begins. Selection of the proper resistance range produces the desired inspiratory air to expiratory air ratio (I:E) of about 1:3 to about 1:4.

The foregoing description of a preferred embodiment of this invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Obvious modifications or variations are possible in light of the above teachings. The embodiment was chosen and described in an effort to provide the best illustrations of the principles of the invention and its practical application, the best mode presently known to the inventors, to thereby enable one of ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims as interpreted in accordance with the breadth to which they are entitled.

Also, this application was prepared without reference to any particular dictionary. Accordingly, the definition of the terms used herein conforms to the meaning intended by the inventors acing as their own lexicographer, in accordance with the teaching of the application, rather than any dictionary meaning which is contrary to or different from the inventors' meaning regardless of the authoritativeness of such dictionary.

What is claimed is:

1. An oscillatory positive expiratory pressure therapy device, comprising:

a housing;

an air-flow tube having a path of air flow movement from an inlet opening for receiving expiratory air passed thereto by a user receiving respiratory therapy, through an outlet opening for discharging the expiratory air passed through said inlet opening;

said air-flow tube including expiratory air responsive closure means positioned in said path of air flow movement and actuable between an open position and a closed position in response to the pressure of expiratory air passed thereto;

said expiratory air responsive closure means including a normally closed non-linear discharge outlet which is opened in response to the presence of a predetermined pressure of expiratory air being passed in said path of air flow movement, and which closes in response to a predetermined varying reduction in the effective discharge area of said non-linear discharge outlet causing the rate of air pressure through said discharge outlet to decrease through said non-linear discharge opening;

said expiratory air responsive closure means further including an acceleratable closure member movable to close said discharge outlet in response to a reduction in the flow rate of expiratory air in said path of air flow movement between a closed position blocking the flow of expiratory air and an open position creating a periodic oscillatory positive expiratory air pressure flow of expiratory air in said path of air flow movement;

nebulizer coupling means for connecting a nebulizer into fluid communication with said air-flow path from said inlet opening to the user;

said nebulizer coupling means being formed in said air-flow tube in fluid communication between said inlet opening into said air-flow tube through which inspiratory air is received there into and said outlet opening for discharging expiratory air;

and wherein said air-flow tube, said inlet opening, said expiratory air responsive closure means, said nebulizer coupling means, and a one-way valve are located within the housing.

2. The oscillatory positive expiratory pressure therapy device of claim **1** wherein: said nebulizer coupling means for connecting a nebulizer into fluid communication with said air-flow path from said inlet opening is positioned for one-way air movement from said inlet opening to a user.

3. The oscillatory positive expiratory pressure therapy device of claim **1**, wherein said closure member is cone-shaped and said non-linear discharge outlet is trumpet-shaped.

4. The oscillatory positive expiratory pressure therapy device of claim **1**, wherein said closure member is cone-shaped and said non-linear discharge outlet is a non-linear tapered discharge orifice.

5. The oscillatory positive expiratory pressure therapy device of claim **1**, further including a magnetic force field applying means for generating a biasing force effecting the opening and closing of said non-linear discharge opening.

6. The oscillatory positive expiratory pressure therapy device of claim **1**, further including means for adjusting the magnitude of the magnetic force field applying means.

7. The oscillatory positive expiratory pressure therapy device of claim **6** wherein said means for adjusting the magnitude of the magnetic field applying means includes a rotatable frequency control dial.

8. The oscillatory positive expiratory pressure therapy device of claim **1**, wherein said expiratory air responsive closure means including a normally closed non-linear discharge outlet which is opened in response to the presence of a predetermined pressure of expiratory air being passed in said path of air flow movement, and which closes in response to a predetermined rate of air pressure decrease through said non-linear discharge opening comprises an oscillatory rocker assembly including a rocker portion pivotally supported on a rocker support platform.

9. The oscillatory positive expiratory pressure therapy device of claim **8** wherein said rocker portion includes a cone-shaped closure member carried on said rocker portion for pivotal movement into and out from said non-linear discharge opening and said rocker support portion includes a tapered curvilinear non-linear discharge orifice which is closed in response to the movement of said cone-shaped closure member.

10. The oscillatory positive expiratory pressure therapy device of claim **9** wherein said non-linear discharge outlet is bell-shaped.

11. The oscillatory positive expiratory pressure therapy device of claim **9** wherein said non-linear discharge outlet is trumpet-shaped.

12. The oscillatory positive expiratory pressure therapy device of claim **1**, further including a nebulizer operatively connected to said nebulizer coupling means.

13. The oscillatory positive expiratory pressure therapy device of claim **12** wherein said nebulizer includes means for supplying medication to said nebulizer.

14. The oscillatory positive expiratory pressure therapy device of claim **1**, further including a mouthpiece supported by said air-flow tube through which inspiratory air and expiratory air are passed to a user.

15. The oscillatory positive expiratory pressure therapy device of claim **1**, further including a facemask supported by said air-flow tube through which inspiratory air and expiratory air are passed to a user.

16. The oscillatory positive expiratory pressure therapy device of claim **1** further including reservoir tubing coupled to said inlet opening of said air-flow tube.

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